WILLIAMS GATEWAY AIRPORT

Chapter Four
AIRPORT DEVELOPMENT ALTERNATIVES

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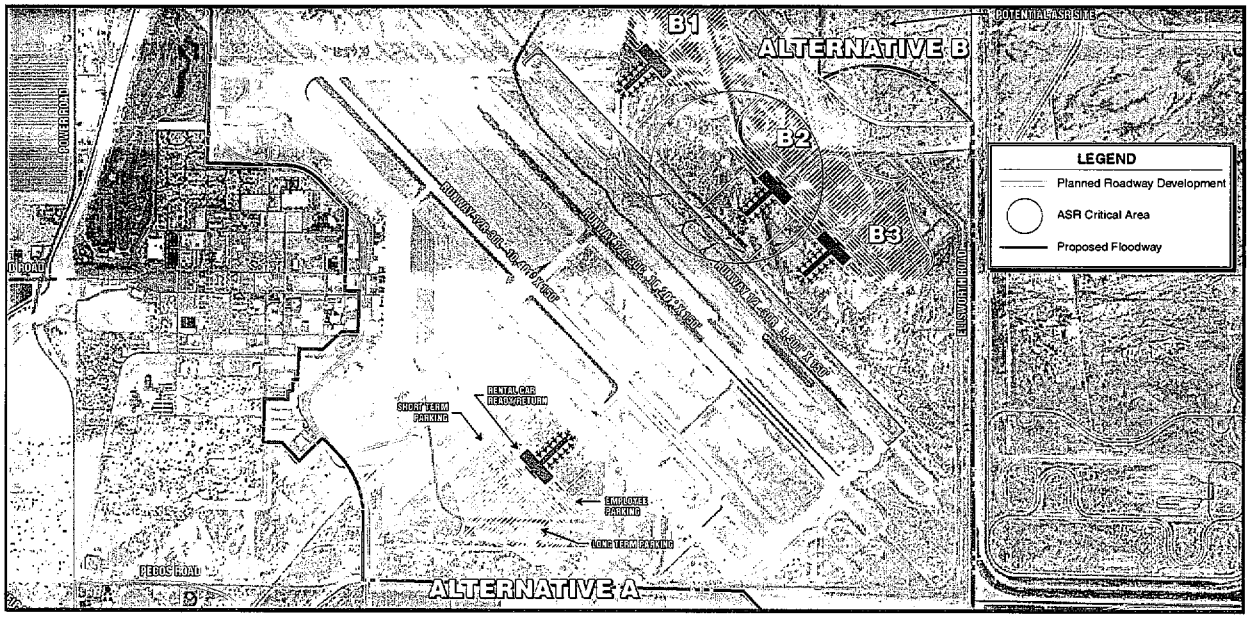

In the previous chapter, airside and landside facility needs that would satisfy projected demand over the planning period were identified. The next step in the master planning process is to evaluate the various ways these facilities can be provided and identify items which need to be taken into consideration prior to developing a finalized master plan concept. Once a finalized master plan concept has been developed, cost estimates will be prepared for the individual projects, a development schedule will be prepared, and potential funding sources for recommended projects will be identified including those projects that are eligible for federal or state funding assistance.

The development alternatives for the airport can be categorized into two functional areas: the airside (runways, taxiways, navigational aids) and landside (passenger terminal building, aircraft storage hangars, aircraft parking area). Within each of these functional areas, specific facilities are required or desired. Although each functional area is treated separately, each area interrelates to the other and affects the development potential of the other. Therefore, these areas must be examined both individually and collectively to ensure a final plan that is functional, efficient, cost effective, and minimizes environmental impacts.

The possible combinations of alternatives can be endless, so some intuitive judgement must be applied to identify those alternatives which have the greatest potential for implementation. The alternative's analysis is an important step in the planning process since it provides the underlying

rationale for the final master plan concept.

DEVELOPMENT OBJECTIVES

It is the overall objective of this effort to provide for a balanced airside and landside complex to serve forecast aviation demands. However, prior to defining specific alternatives, development objectives should first be defined. The Williams Gateway Airport Authority (WGAA) provides the overall guidance for the operation and development of Williams Gateway Airport. It is of primary concern that the airport is marketed, developed, and operated for the betterment of its users. Consistent with previous planning, including the Williams Air Force Base Reuse Study, the following development objectives have been defined:

- Develop an attractive, efficient, and safe aviation facility in accordance with Federal safety and security regulations.
- Develop facilities to efficiently serve commercial air passenger service.
- Develop facilities to efficiently serve national and international air cargo carriers.
- Develop facilities which meet the projected demand for increased general aviation use of the airport, including increased business and corporate use of the airport.
- Develop facilities to efficiently serve aircraft flight training in conjunction with the Williams Campus.
- Target local economic development through the development of WGAA property and facilities for both aviation-related and non-aviation related commercial and industrial uses.

AIRPORT DEVELOPMENT ALTERNATIVES

Three basic conceptual alternatives have been considered. The first considers the transfer of projected aviation demand to other airports in the area. The second is a "no development" or "do nothing" alternative where the existing airport is left as is. The third alternative considers a series of development alternatives for the airport to meet projected demand within the physical and environmental constraints that are currently present. The alternative concepts presented in this chapter are provided for the purpose of reviewing the relative merits of each as well as the impacts of the implementation of each alternative on the existing airport facilities, environs, and community.

DEVELOPMENT AT OTHER FACILITIES

Development at other facilities primarily considers shifting aviation services to other existing airports and/or developing a new airport site.

The alternative of shifting aviation services to another existing airport was found an undesirable alternative due to the inability of existing airports in the southeast valley to accommodate forecast demand for Williams Gateway Airport. As detailed in Chapter Two, Aviation Demand Forecasts, Williams Gateway Airport is expected to serve a wide range of commercial and general aviation activity (including scheduled airline service and air cargo activities) through the planning period.

Existing airports serving the southeast valley include Mesa Falcon Field Airport, Chandler Municipal Airport, and Stellar Airpark. These airports are specifically designed to accommodate general aviation activity and do not have sufficient airfield and landside facilities to accommodate commercial airline and air cargo aircraft (without significant upgrades to these facilities). While these airports could accommodate a portion of the forecast general aviation demand for Williams Gateway Airport, these airports have a specific demand which they serve. Accommodating demand from Williams Gateway Airport could potentially reduce the long term ability of these airports to meet this demand.

In 1997, Williams Gateway Airport accommodated 106,848 local general aviation training operations, many of which were associated with training programs located at the Williams Campus. These training programs were located at the Williams Campus because of the unique opportunity to integrate collegiate flight training programs with the Williams Air Force Base reuse. It would be difficult to relocate these training programs to other regional airports without significant expense.

Stellar Airpark is privately-owned and operated. Private airports face many problems that affect their ability to remain in operation; most notably insurance costs, incompatible land use encroachment, and liability considerations. Therefore, it should not be assumed that private airports can or will remain open to the public over the long term.

Memorial Airfield, owned and operated by the Gila River Indian Community, also serves aviation demand in the southeast valley. Memorial Airfield features an 8,650-foot primary runway. While this length is sufficient to serve some large transport aircraft, a considerable investment in landside and airfield facilities would be required to accommodate commercial aircraft on a regular basis. Similar to Stellar Airpark, a number factors could affect the ability of Memorial Airfield to remain open over the long term.

While aviation demand at Williams Gateway Airport could be transferred to other airports in the metropolitan area such as Scottsdale Airport, Phoenix-Deer Valley, Glendale Municipal Airport, and Phoenix-Goodyear Airport, these airports are a considerable distance from Williams Gateway Airport and, therefore, would not be in a good position to accommodate the demand identified for Williams Gateway Airport.

Furthermore, the continuing growth expected by the major employers in the area as well as the infusion of new industries into the local communities demonstrates the need for a highly functional airport. Commercial and general aviation activity play an important role in the way companies conduct their business. Williams Gateway Airport is expected to significantly contribute to economic development of the area by serving both the commercial and general aviation needs of a large portion of the southeast valley. As demonstrated, this role is not easily replaced by another existing airport in the southeast valley without tremendous expense.

Construction Of A New Airport Site

The alternative of developing an entirely new airport facility to meet the future commercial and general aviation needs of the southeast valley was also considered. This was found to be less feasible than accommodating demand at other regional airports, primarily due to economic and environmental concerns.

Land acquisition, site preparation, and the construction of an entirely new airport near an urbanized area can be a very difficult and costly action. In addition, closing the airport would mean the loss of a substantial investment in a sizeable transportation facility and agreements made with the United States Government during the transfer of the Air Force Base to the community and subsequent receipt of federal and state grant funds. In a situation where public funds are limited, the replacement of a functional and expandable airport facility would represent an unjustifiable loss of a significant public investment.

Even if the additional expense to relocate the airport could be justified, it is unlikely that as ideal of a location could be found. The existing airport is uniquely situated along Power Road, Ellsworth Road, and Williams Field Road which are primary links to the surrounding community. Additionally, Williams Gateway Airport is only two miles from the planned location of the San Tan Freeway which will provide a highway link to the entire southeast valley. Furthermore, areas immediately surrounding the airport have been planned for compatible uses.

From social, political, and environmental standpoints, the commitment of a new large land area must also be considered. The public sentiment toward new airports in the last few years has been very negative, primarily because a new airport often requires the acquisition of large parcels of both public and privately-owned land. Furthermore, the development of a new facility similar to Williams Gateway Airport would likely take ten years to become a reality, if at all. In addition, the potential exists for significant environmental impacts associated with disturbing a large land area when developing a new airport site. Developing a new airport when the existing airport can be improved for much less cost cannot be considered a prudent alternative.

DO-NOTHING ALTERNATIVE

In analyzing and comparing the costs and benefits of various development alternatives, it is important to consider the consequence of no future development at Williams Gateway Airport. The "do-nothing" alternative essentially considers keeping the airport in its present condition and not providing for any type of improvement to the existing facilities. The primary result of this alternative would be the inability of the airport to satisfy projected demands and continue its transformation from a former military facility to a full-service civilian airport.

The long-term consequences of the "do-nothing" alternative extends beyond the immediate southeast valley area. Williams Gateway Airport is part of a system of public airports in the Phoenix metropolitan area that serve the aviation needs of the community. Along with six other airports in the metropolitan area, Williams Gateway Airport serves as general aviation reliever airport for Phoenix Sky Harbor International Airport which helps avoid a major concentration of smaller general aviation aircraft and large commercial jets at a single airport. Without such facilities Phoenix Sky Harbor International Airport would be exceeding its capacity and experiencing significant delays.

Williams Gateway Airport is also expected to accommodate commercial and air cargo activity for the southeast valley. This role will become increasingly more important as the southeast valley continues to grow and activity becomes more concentrated at Phoenix Sky Harbor International Airport (which currently accommodates most of this activity for the southeast valley).

The unavoidable consequence of the "do-nothing" alternative would involve the airport's inability to attract potential airport users. Corporate aviation plays a major role in the transportation of business leaders and technical staff. Thus, an airport's facilities are often the first impression many corporate officials will have of the community. If the airport does not have the capability to meet hangar, apron, or airfield needs of potential users, the community's capabilities to attract business that rely on air transportation will be diminished.

An overall impact of this alternative will be the inability to attract new users, especially those businesses and industries seeking location with adequate and convenient aviation facilities. Williams Gateway Airport has much to offer in terms of airfield and landside facilities. Without regular maintenance and additional improvements, potential users and business for the Mesa/Gilbert/Queen Creek area could be lost.

To propose no further development at the airport would be inconsistent with current local and regional planning and economic development to attract more business and industry to the southeast valley and inconsistent with recent WGAA improvements to the airport (namely runway reconstruction) and patent and grant assurances.

Therefore, the "do-nothing" alternative is not considered prudent or feasible.

Conclusions

Overall, transferring service to an existing airport in the region, developing an entirely new facility, or not continuing to develop Williams Gateway Airport are undesirable options and should not be pursued. Williams Gateway Airport is fully capable of accommodating the long-term aviation demands of Mesa/Queen Creek/Gilbert and the southeast valley area and should be developed in response to those demands. The airport has the potential to continue to develop as a quality airport that could greatly enhance the economic development of the community and provide necessary services for existing residents and businesses.

AIRFIELD ALTERNATIVES

Airfield facilities are, by nature, the focal point of the airport complex. Because of their primary role and the fact that they physically dominate airport land use, airfield facility needs are often the most critical factor in the determination of viable airport development alternatives. In particular, the runway system requires the greatest commitment of land area and often imparts the greatest influence on the identification and development of other airport facilities. Furthermore, due to the nature of aircraft operations, there are a number of FAA design criteria that must be considered when looking at airfield improvements. These criteria can often have a significant impact on the viability of various alternatives designed to meet airfield needs. The primary planning issues related to the airfield include:

- Airfield Capacity
- Runway Length
- Instrument Approaches
- Taxiway A Partial Taxiway Segments

Airfield Capacity

The airfield capacity analysis in Chapter Three determined the annual service volume (ASV) for the airport under two conditions. First, ASV was calculated assuming that the existing three parallel runway configuration is maintained through the planning period. A second calculation was made to determine the ASV should the center runway be closed and only the two outer runways maintained through the planning period as recommended in the previous master plan.

Table 4A summarizes the results of these analyses. As shown in the table, the 1997 level of 186,406 operations represented approximately 45 percent of the ASV with three parallel runways and 63 percent of ASV with a two parallel runway configuration. Should operations occur as forecast, the airport could expect to reach approximately 92 percent of ASV by the end of the planning period with three parallel runways and exceed the ASV of a two parallel runway configuration. In both situations, the airport will exceed the planning threshold of 60 percent of the ASV established by the FAA to consider

capacity improvements. Therefore, it is necessary to consider alternatives for increasing airfield capacity at Williams Gateway Airport to accommodate the forecast activity levels expected to occur within the planning period of this master plan.

TABLE 4A
Annual Service Volume Comparison

	1997	Short Term	Intermediate Term	Long Term
Annual Operations	186,406	232,000	261,500	338,200
Existing Airfield (Three Parallel Runways)				
Annual Service Volume	408,000	398,000	391,000	365,000
Operations Percentage of ASV	45.7%	58.3%	66.9%	92.7%
Annual Aircraft Delay (Hours)	932	1,742	2,615	8,737
Average Delay Per Aircraft (Min.)	.30	.45	.60	1.55
Airfield Capacity with Exit Taxiway Improvements (Three Parallel Runways)				
Annual Service Volume	484,000	471,000	463,000	431,000
Operations Percentage of ASV	38.5%	49.3%	56.5%	78.5%
Annual Aircraft Delay (Hours)	777	1,355	1,961	5,073
Average Delay Per Aircraft (Min.)	.25	.35	.45	.90
Two Parallel Runways				
Annual Service Volume	294,000	284,000	277,000	268,000
Operations Percentage of ASV	63.4%	81.8%	94.4%	126.2%
Annual Aircraft Delay (Hours)	1,709	3,677	6,973	28,183
Average Delay Per Operation (Min.)	.55	.95	1.6	5.0
Airfield Capacity with Exit Taxiway Improvements (Two Parallel Runways)				
Annual Service Volume	345,000	335,000	329,000	315,000
Operations Percentage of ASV	54.0%	69.3%	79.5%	107.4%
Annual Aircraft Delay (Hours)	1,243	2,516	4,140	20,856
Average Delay Per Aircraft (Min.)	.40	.65	.95	3.7

Taxiway improvements are one means of improving the operational efficiency and capacity of the airfield. Adequate runway exits and circulation are essential to achieving the optimum capacity potential of any runway system. Since taxiway improvements are generally far less expensive than runway improvements, it is important to ensure maximum capabilities are being derived from the taxiway system before making runway changes to improve capacity.

The ideal taxiway system would include a full-length parallel taxiway for each runway with adequate exits spaced along the runway to reduce runway occupancy time. In some cases, high speed exits can further minimize

occupancy time. Connecting taxiways would be available, as necessary, to provide convenient access between the airfield and various terminal facilities on the airport.

Presently, only Runway 12R-30L is served by a full-length parallel taxiway. An exit taxiway is available at each runway end with three additional exit taxiways available along the runway. Runways 12C-30C and 12L-30R are not served by full-length parallel taxiways and only have exit taxiways at each end and at approximately midfield.

To examine the potential improvements to the annual service volume, the capacity analysis was run assuming that the exit rating was maximized. The maximum exit taxiway rating requires at least four exit taxiways, 750 feet apart, between 3,000 and 5,000 feet from the threshold for visual conditions and between 5,000 and 7,000 feet for instrument conditions. Presently, under the capacity model, each runway is credited with one exit although there are additional exit taxiways available.

Table 4A compares these results to the annual service volume previously calculated for a three parallel runway configuration and a two parallel runway configuration. As shown in the table, adding exit taxiways increases the ASV by approximately 18 percent. However, as can been seen from **Table 4A**, even with exit taxiway improvements, the airport is expected to reach approximately 92 percent of the ASV with three parallel runways and exceed the ASV with two parallel runways during the planning period.

Conclusions

Additional taxiway exits provide the only physical means of improving airfield capacity. As shown, a full complement of exit taxiways can increase ASV by approximately 18 percent. The current airfield configuration of three parallel runways maximizes capacity during visual conditions by providing sufficient separation distances between runways for simultaneous operations. Runway 12R-30L and 12L-30R are separated by 2,500 feet. This provides for simultaneous operations to both these outside runways for a mix of jet and propellor-engine aircraft. The separation distances between Runway 12C-30C and Runways 12L-30R and 12R-30L can provide for simultaneous operations to all three runways. While a slight improvement in poor weather (instrument) capacity could be achieved with greater runway separation distances (which would allow for simultaneous operations to two runways instead of the single runway as is currently available), poor weather conditions occur approximately only two percent of the time and therefore affect only a small portion of itinerant operations.

Presently, the airport has sufficient capacity to accommodate existing and short term demand without significant delay to aircraft. With taxiway improvements, capacity should be improved and delay reduced. However, considering forecast long-term operational demand, the ability to have three runways to provide needed capacity during peak periods can

significantly reduce aircraft delay. Therefore, consideration may be given to maintaining the center runway for peak period operations.

Runway Length And Instrument Approaches

The runway length analysis completed in Chapter Three determined that the existing runways do not provide sufficient length for typical cargo and passenger transport aircraft takeoff requirements during the warm summer months and that consideration may be given to providing 12,500 feet for aircraft takeoff requirements. Present demand indicates that a 12,500-foot long runway is not a priority at this time. The existing runway length is adequate for the mix of transport aircraft currently using Williams Gateway Airport. The need for a runway extension will be a factor of future commercial airline and air cargo activities at the airport. As detailed in the Facility Requirements analysis, the need for additional runway length will be driven by aircraft type and the stage length of flights from Williams Gateway Airport.

Through a review of development alternatives it was determined that any extension is best placed on either Runway 12L-30R or Runway 12R-30L since these runways are located adjacent to existing and future landside development areas. Ideally, the longest runway is best placed adjacent to the landside facilities needing this additional runway length since this provides the shortest and most direct route to the runway. Additionally, the separation distance between Runway 12C-30C and Runways 12L-30R and 12R-30L does not meet minimum standards for simultaneous aircraft operations for wake turbulence clearance.

Exhibit 4A depicts runway extension Alternatives A and B. Alternative A depicts previous planning efforts and incorporates the runway extension currently shown on the existing airport layout drawing. In this alternative, Runway 12L-30R is extended 550 feet south and 2,650 feet north to provide an ultimate runway length of 12,500 feet. Alternative B extends Runway 12R-30L 1,300 feet south to intersect with Taxiway P and 800 feet north to provide for an ultimate length of 12,500 feet.

Each alternative assumes that the longest runway will also serve as the primary instrument runway, providing ½ mile visibility minimum approaches to each runway end. An Instrument Landing System (ILS) is presently installed at the Runway 30C end. Consistent with previous planning, the ILS is recommended for relocation to the primary instrument runway.

As discussed previously in Facility Requirements, the FAA is proceeding with a program to replace all existing navigational aids with the satellite-based Global Positioning System (GPS). This may ultimately include replacing existing ILS with GPS. Whether the existing ILS system is relocated or a GPS approach is established, Runway Protection Zone (RPZ) requirements will be the same. Shown in green on **Exhibit 4A** are RPZ requirements assuming a ½ mile visibility minimum

instrument approach (either ILS or GPS) to each runway end.

Alternative A locates the longest runway adjacent to the area reserved in the previous master plan for future terminal and air cargo facilities. This extension requires crossing the Powerline Floodway in two locations. The cost to implement this alternative is estimated at $9.3 million (including land acquisition costs to protect the RPZ at each runway end and to relocate the Powerline Floodway. Present planning includes the relocation of the Powerline Floodway in conjunction with floodway development for the future Santan Freeway. The relocated Powerline Floodway would flow into this floodway.

To effectively serve development on the east side of the airport, a parallel taxiway must be constructed to Runway 12L-30R. A parallel taxiway extending the full-length of Runway 12L-30R (12,500 feet) is estimated at $8.4 million. This taxiway would also have to cross the Powerline Floodway.

In comparison, the cost to implement Alternative B is estimated at $3.7 million (including land acquisition costs to protect the RPZ to each runway end). This cost advantage is achieved through less taxiway and runway development since this extension is provided along what is now the longest runway at the airport served by a parallel taxiway. Additionally, less property acquisition is necessary to protect the RPZs at each runway end. This alternative does not require crossing the Powerline Floodway.

Since it is the intention to locate the longest runway adjacent to future terminal and air cargo sites, the selection of a runway extension alternative, is to a certain extent, dependent upon the landside development alternatives summarized later within this chapter.

Taxiway A Partial Taxiway Segments

Taxiway A provides primary access between the runways and apron area and includes two partial parallel taxiway segments. The northwest portion of Taxiway A extends along the outer edge of the north apron between Taxiway H and Taxiway G. This portion of Taxiway A is located 630 feet from the Runway 12R-30L centerline. The southwest portion of Taxiway A extends from Taxiway V to Taxiway P and is located 800 feet from the Runway 12R-30L centerline.

Exhibit 4B depicts three alternatives for providing taxiway access the full-length of Runway 12R-30L. Alternative A depicts previous planning efforts which simply provided an angled connection between the existing taxiway segments. Currently under design, this connection is estimated to cost $1.2 million.

As an option to creating an angled taxiway segment, Alternative B proposes to extend the northwest portion of Taxiway A the full-length of Runway 12R-30L. By moving the southwest portion of the taxiway

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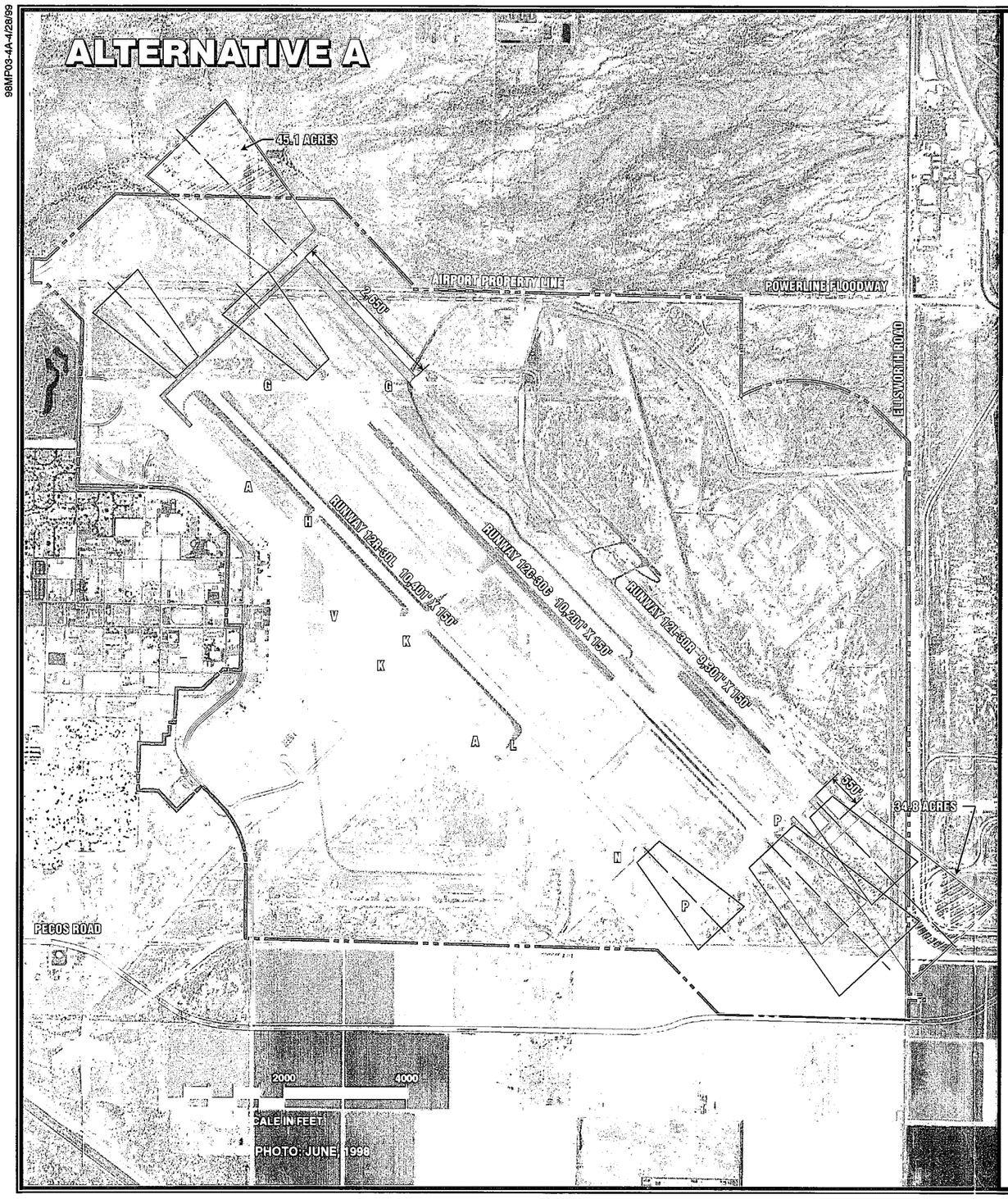

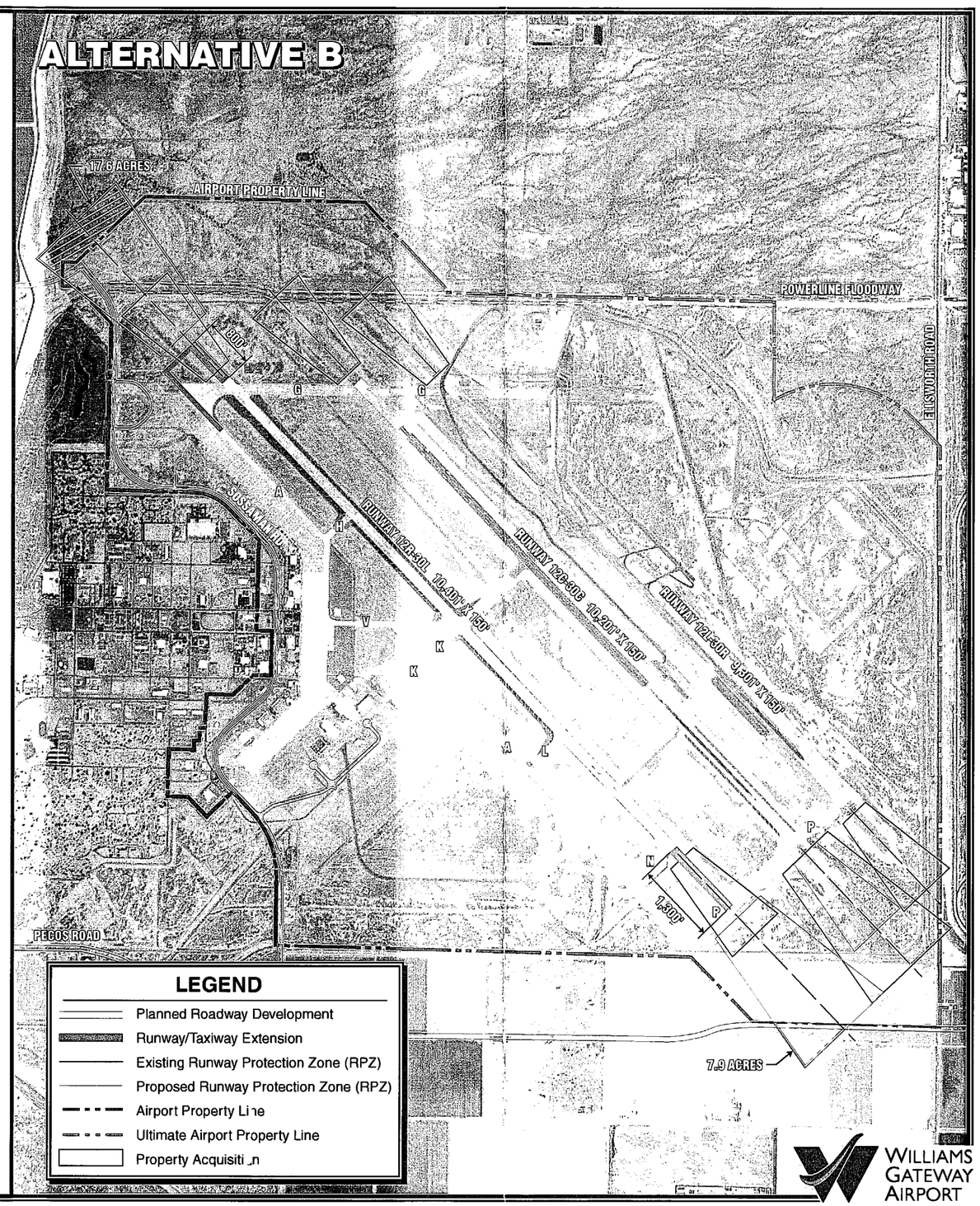

WILLIAMS GATEWAY AIRPORT

Exhibit 4A
RUNWAY EXTENSION ALTERNATIVES

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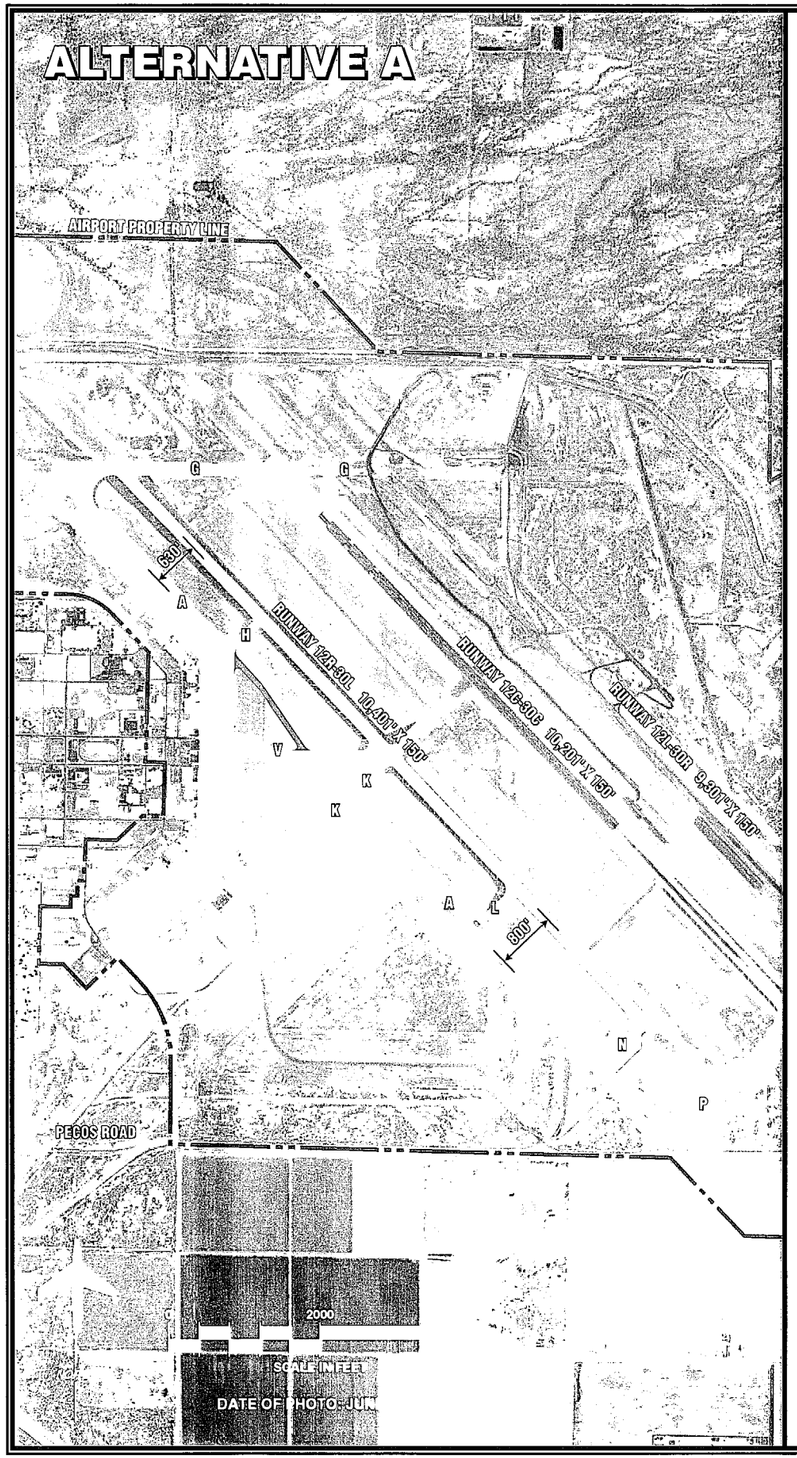
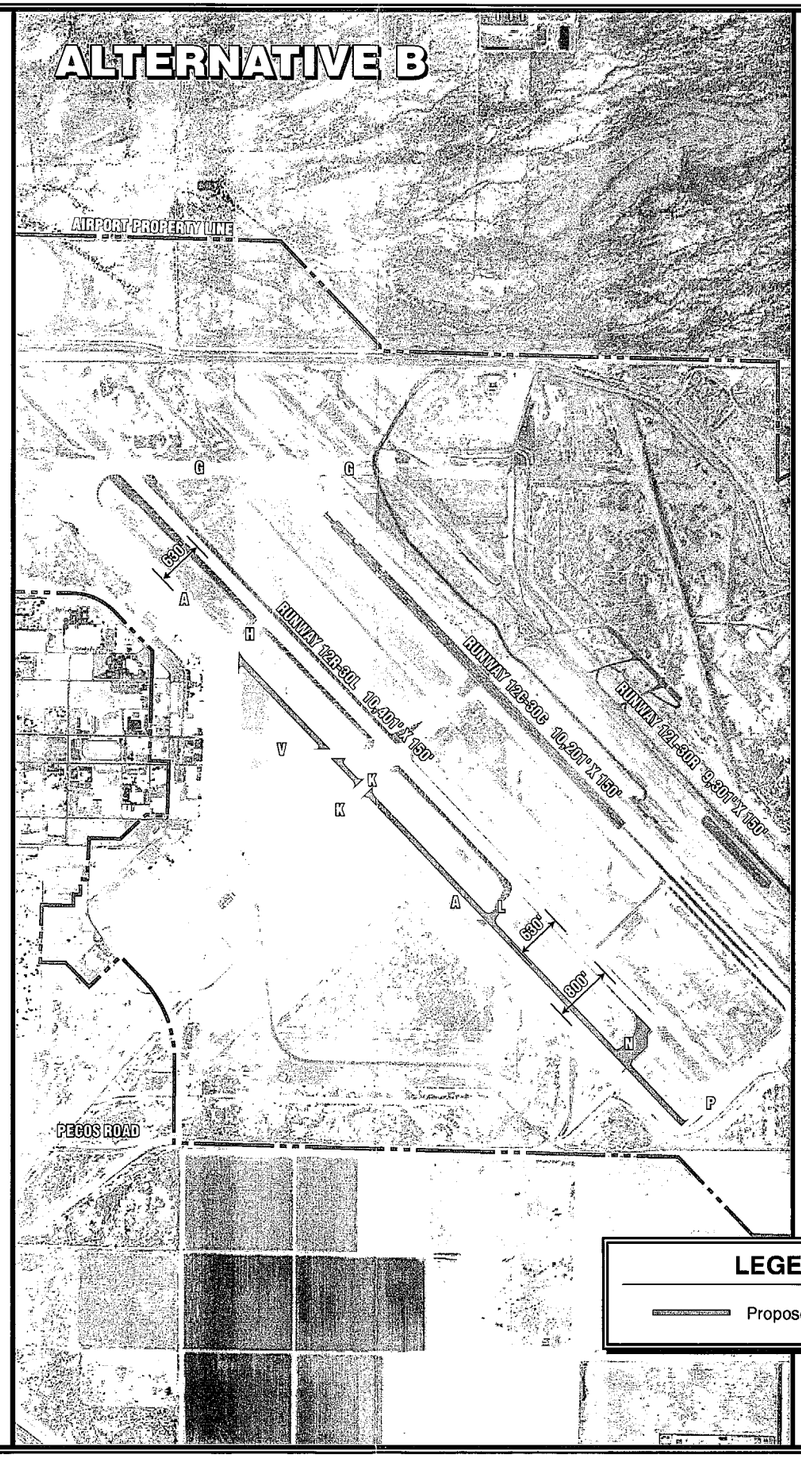
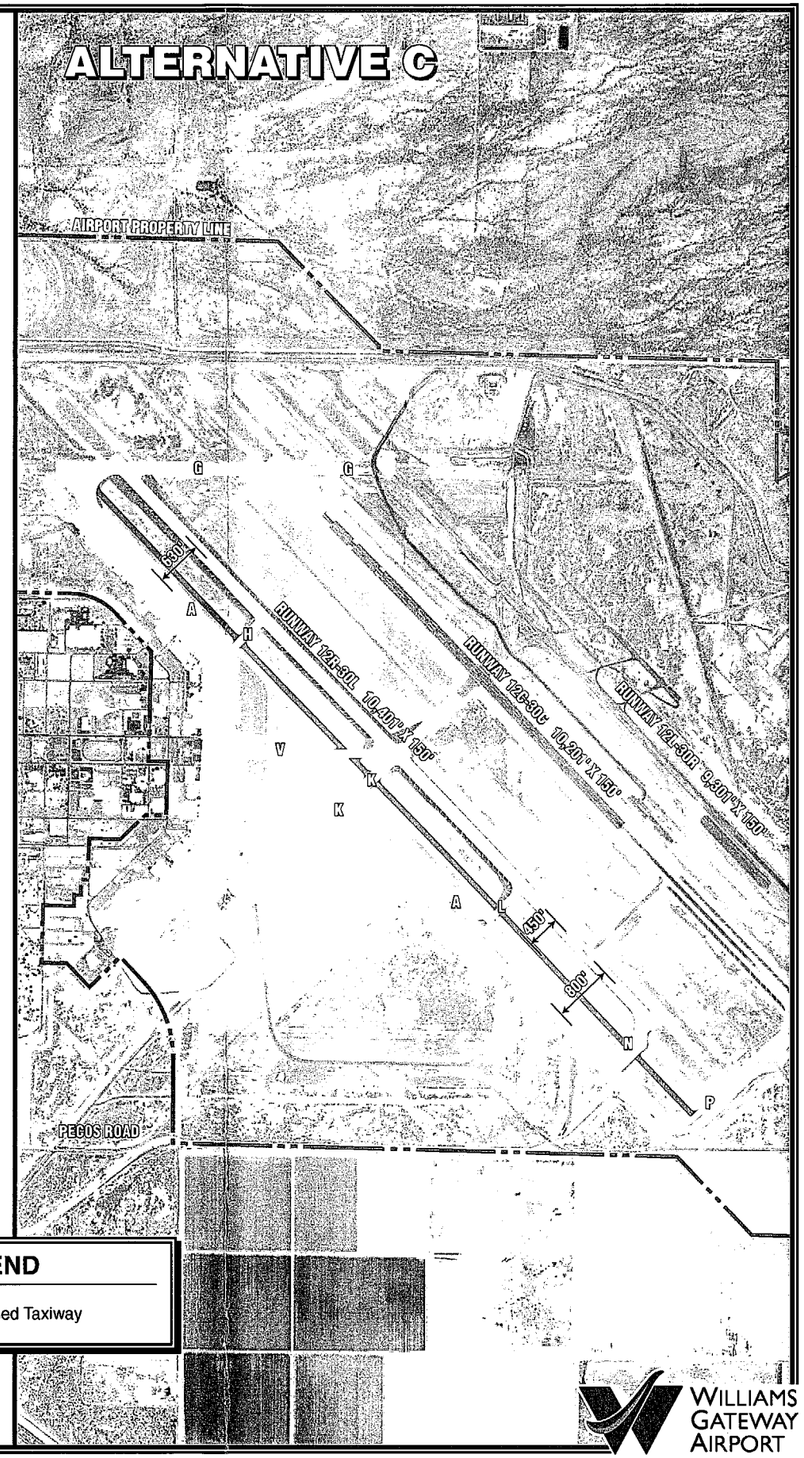
ALTERNATIVE A



ALTERNATIVE B



ALTERNATIVE C



LEGEND

Proposed Taxiway

WILLIAMS GATEWAY AIRPORT

Exhibit 4B
TAXIWAY A ALTERNATIVES

approximately 170 feet east, an additional 24 acres of property are made available for development. This alternative is estimated to cost approximately $5.7 million.

Presently, each partial parallel taxiway segment exceeds the minimum runway/taxiway separation distance of 450 feet specified by the Federal Aviation Administration (FAA). Alternative C examines the option of relocating Taxiway A at this minimum separation distance from Runway 12R-30L. The primary advantage of this alternative is that, similar to Alternative B, this alternative provides an additional 65 acres for development along the taxiway. This is especially beneficial along the north apron area where the existing location of Taxiway A limits the full use of the apron. Relocating Taxiway A as shown, can provide for the full use of the entire north apron area, including the area presently dedicated to taxiway use. This alternative is estimated to cost approximately $7.0 million.

AIR CARRIER TERMINAL AREA ALTERNATIVES

The components of the terminal area include the passenger terminal building, terminal apron, aircraft gate positions, functional areas inside the building, and automobile parking for the public, terminal employees, and rental car companies. Presently, there are no passenger terminal facilities at Williams Gateway Airport. As discussed previously, passenger service is expected to be established at Williams Gateway Airport during the planning period. This is expected to begin with charter activities and gradually transition to include scheduled passenger service.

The WGAA is developing plans to renovate Building 15 to serve as an initial/interim passenger terminal building. Shown in gray and black on **Exhibit 4C** is a layout of the current renovation plans for Building 15. As shown, Building 15 will provide ticketing, airline office, bag claim, departure area, and retail space. Only ground-level boarding will be available. Once renovated, Building 15 will provide approximately 23,600 square-feet of space for terminal functions. Presently, the WGAA is completing the renovation of the restroom facilities as depicted on the exhibit.

Based upon the terminal area requirements prepared in the facility requirements analysis, Building 15 should reasonably be expected to serve upwards of 100,000 passenger enplanements annually. **Exhibit 4C** also depicts expansion potential which can increase the passenger service level of this building to approximately 250,000 annual enplanements. To accomplish this, the departure area is reconfigured and the building expanded by approximately 4,700 square feet to the south to provide additional ticketing, airline office, and baggage make-up areas. This provides a more traditional ticketing area layout by locating airline offices behind the ticket counters and aligning the ticket counters to face the arriving passengers. The baggage make-up area is also aligned with the terminal apron for the processing of outbound baggage.

Additional bag claim lobby, bag claim frontage, and rental car offices are provided through a 9,900 square-foot expansion of Building 15 to the north. A 12,800 square-foot departure lounge is developed along the east side of Building 15. Ground level boarding is assumed to continue with this expansion. This depicted development is estimated to cost approximately $4.1 million.

Shown in red on **Exhibit 4D** are existing site improvement plans for Building 15 which include the development of a three-lane airport loop road in front of Building 15 along Sossaman Road and 294 automobile parking spaces. Outlined in yellow are potential automobile parking areas. As shown, four separate parking areas are available adjacent to existing planned parking areas. However, the only vacant parcel of land is located west of Sossaman Road. Development to the north and south of Building 15 will require the demolition of Buildings 19 and 35 and Hangar 24 to provide additional surface parking positions. Hangar 24 is eligible for the National Register of Historic Places. Demolishing this building may be difficult and time-consuming considering this eligibility. Building 19 also accommodates WGAA operations staff and communications. An alternate location would need to be established for these activities prior to demolishing Building 19.

The terminal area requirements prepared in Chapter Three indicated that a total of 487 parking spaces are needed to serve public parking, rental car ready/return, and terminal employee parking needs at 100,000 annual enplanements. Approximately 1,174 parking spaces are needed to serve 250,000 annual enplanements. Assuming the demolition of Buildings 19 and 35 and Hangar 24 and the development of surface parking on the vacant parcel of land west of Sossaman Road, an additional 473 surface parking positions can be created adjacent to Building 15. Combined with planned site improvements, approximately 767 parking spaces can be created near Building 15, which is well short of projected parking needs for 250,000 enplanements.

The cost to develop the parking areas at Buildings 19 and 35 and Hangar 24 is estimated at $570,000 (including building demolition costs). The parking area west of Sossaman Road is assumed to be developed privately.

A privately-developed parking garage has been proposed for the vacant area west of Sossaman Road. Combining the approximate capacity of this parking garage (300 spaces) with the potential surface parking created through the demolition of Buildings 19, 24, and 35 and the planned site improvements, provides approximately 892 parking spaces. Again, well short of the projected parking needs for 250,000 enplanements.

To reduce aircraft ground-handling, aircraft parking at the terminal is expected to utilize "power-in/power-out" techniques which eliminate the need for aircraft tugs. As shown on **Exhibit 4D**, aligning aircraft parking positions parallel with the building can provide for up to three wide-body aircraft parking positions utilizing "power-in/power-out" techniques.

98MP03-4C-10/29/98

LEGEND

- Walls to be Removed
- Walls to be Built
- Building Expansion

NORTH

0 25 50
SCALE IN FEET

DEPARTURE HOLDROOM

PUBLIC LOBBY

BAG MAKE-UP

AIRLINE OFFICE

TICKET COUNTERS

TICKET LOBBY

BAGGAGE CLAIM DEVICE

BAGGAGE CLAIM DEVICE

AUTO RENTAL

BAG CLAIM

RETAIL

EXIT

RESTAURANT

RISER ROOM

MENS LAV.

WOMENS LAV.

POLICE OFFICE

HALLWAY

WOMENS RESTROOM

COMMUNICATIONS ROOM

MENS RESTROOM

ENTRY

WILLIAMS GATEWAY AIRPORT

Exhibit 4C
EXPAND BUILDING 15

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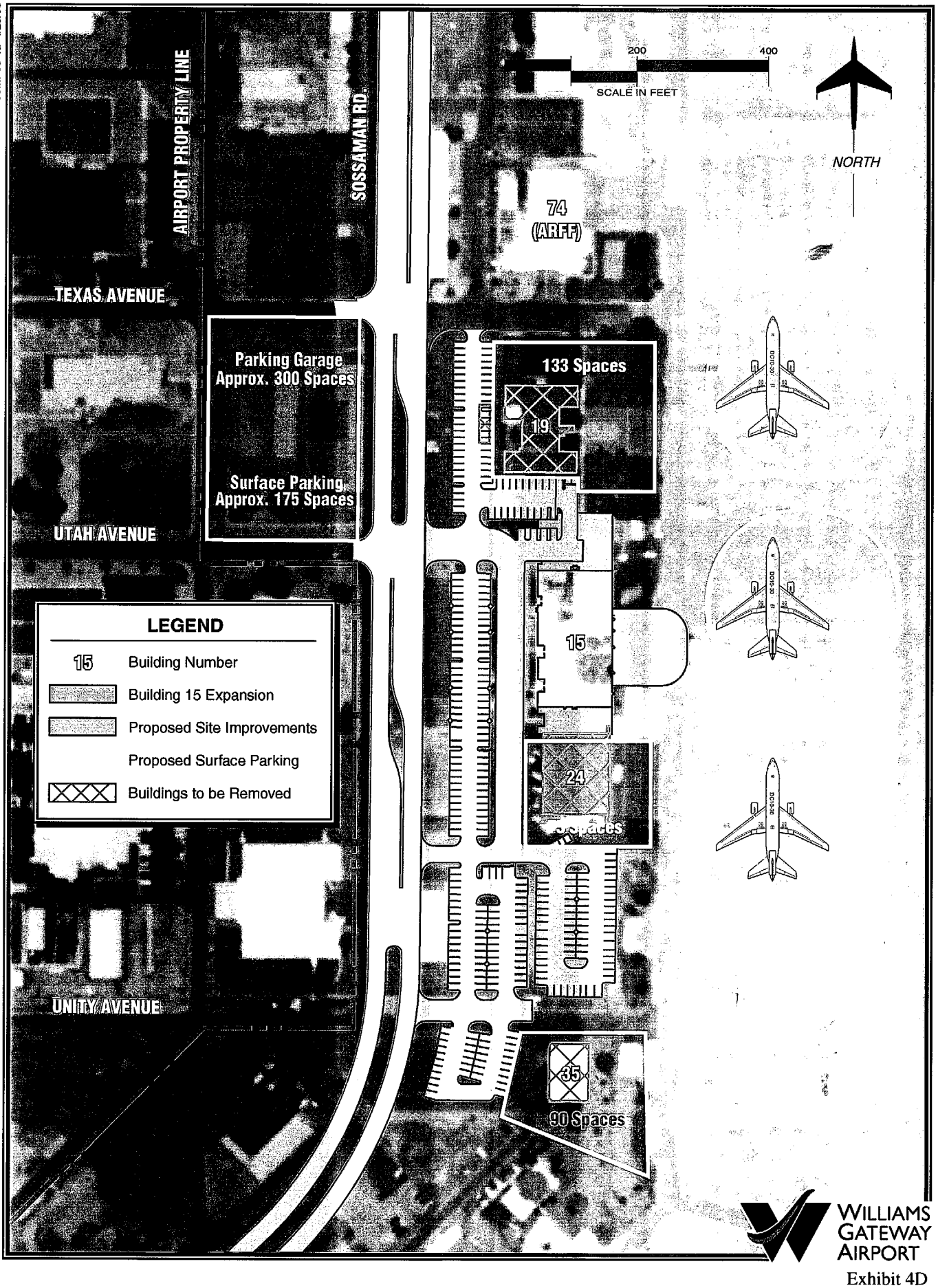

WILLIAMS GATEWAY AIRPORT

Exhibit 4D

BUILDING 15 SITE IMPROVEMENTS

Conclusions

A limited expansion of Building 15 could possibly serve upwards of 250,000 annual enplanements. An additional 247 surface parking positions can be created adjacent to the planned 294 parking spaces at Building 15. However, this requires the demolition of Buildings 19 and 35 and Hangar 24. A vacant lot west of Sossaman Road can provide for an additional 175 surface parking spaces. A parking garage (which has been proposed for this area) could provide 300 parking spaces. While it is possible to create the additional surface parking, existing revenue producing buildings must be demolished. Additionally, projected parking requirements at 250,000 annual enplanements can not be met at the current site, even with these additional parking areas.

New Terminal Area Site Alternatives

Considering the limitations on the existing site to meet projected long-term terminal area needs, an evaluation of a permanent terminal site has been undertaken. This begins with a review of terminal design concepts.

There are several basic terminal design concepts: simple, linear, pier finger, satellite, and transporter. A simple terminal design concept involves a single building accommodating all passenger processing functions (ticketing, bag claim, departure lounges). Aircraft parking is adjacent to the airside portion of the building and normally involves ground level boarding. A simple terminal design concept offers the advantage of close-in parking and reduced walking distances to the terminal. Additionally, walking distances within the terminal are minimal. With a single departure area, security screening is usually achieved through a single location. The renovation and use of Building 15 is considered a simple terminal design.

A linear terminal design concept builds upon the simple terminal design concept by providing for a lengthened building to provide for aircraft parking along the entire length of the building. A linear terminal design is distinguished from a simple terminal design as common facilities (such as departure areas, ticket counters, etc.) are duplicated throughout the building. A linear terminal design can be easily expanded on either end to provide for additional space if needed.

The pier finger terminal design concept builds upon the simple terminal design by providing for aircraft gate and departure areas along a pier extending onto the apron from the building. In contrast to the linear terminal design, the pier finger terminal design has the advantage of providing for centralized ticketing and bag claim functions without having to duplicate these features in other portions of the terminal. This offers operating efficiencies for the airlines and easier aircraft movements along the apron. Walking distances become a factor in this design as some aircraft gates can be located at a considerable distance from the main terminal. Apron design is an important component of the pier finger design as the apron must allow

for the development of the pier finger while providing for adequate taxiway areas.

In contrast to a pier finger, a satellite terminal design has aircraft gates located at the end of concourse rather than being spaced along the concourse in the pier finger design. The satellite concourse does not lend itself to expansion as the entire concourse must be constructed at once. A pier finger offers more flexibility as additional gates can be added as needed.

A transporter terminal design concept involves a simple terminal design with passengers transported to aircraft via a mobile vehicle. In comparison to other terminal design concepts, the transporter concept is labor intensive and more costly to operate. This design does allow for excellent aircraft maneuvering on the apron and less congestion at the terminal gate.

A pier finger terminal design has been selected for the alternatives analysis. A pier finger requires the largest apron area when compared with other terminal design concepts but offers the greatest flexibility for the future construction and operation of a terminal at Williams Gateway Airport. Following a gradual growth trend in enplanements, a pier finger terminal can be easily expanded first from a simple or linear terminal to add a pier finger as additional aircraft gates are needed.

Two alternatives have been considered for a permanent terminal site. Alternative A considers development along the west side of the airport in a vacant area south of the airport traffic control tower. Alternative B considers development potential east of Runway 12L-30R. Each alternative was developed using a 279,000 square-foot terminal building, 12 second-level boarding gate positions, a terminal loop road, 5,809 long and short term parking spaces, 200 rental car ready/return spaces, and 400 terminal employee parking spaces which are estimated to meet projected long-term demand. Both alternatives are depicted on **Exhibit 4E**.

Among the advantages of Alternative A are that this alternative takes maximum advantage of existing vacant land south of the ATCT and places terminal development along an existing taxiway. This area will be served by primary utility lines once Sossaman Road construction is complete. Among the disadvantages of this site, are that this site is not centrally located to the airfield and that direct access to the planned San Tan Freeway is not available. Access would be via Sossaman Road and Pecos Road. A known archaeological site (referenced as the "In Between" site) is located in this area. Additional study of this area might be required before construction can begin.

Alternative B considers three potential terminal locations east of Runway 12L-30R. Prior to defining each of these alternative locations, development constraints in this area must be considered. First, is the location of the Airport Surveillance Radar (ASR) tower. As shown on **Exhibit 4E**, the ASR is located approximately 1,400 feet east of the midpoint of Runway 12L-

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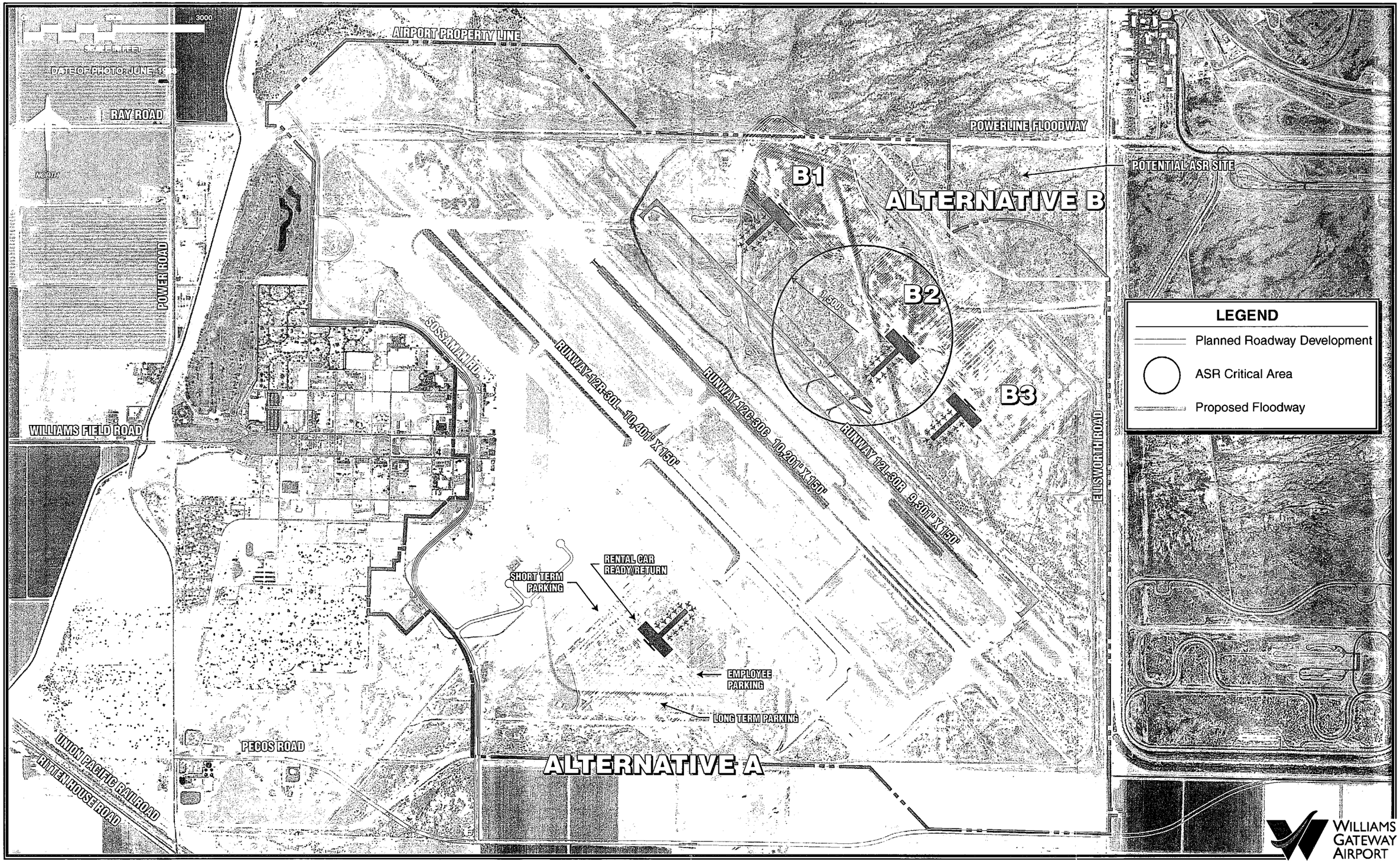


WILLIAMS GATEWAY AIRPORT

Exhibit 4E
PASSENGER TERMINAL
LOCATION ALTERNATIVES

30R. The ASR, which is owned and operated by the FAA, is used in regional air traffic control activities and provides air traffic controllers with aircraft position and altitude information. To protect the ASR from development which could interfere with the ASR signal, the FAA normally requires that development within a 1,500-foot radius of the area be of materials which would not interfere with the ASR signal and that buildings and trees remain below the base of the ASR which is generally elevated to reduce ground clutter signals. A second consideration is the location of the Powerline Floodway and proposed floodway along the north side of the airport. Any development in this area will require bridging and channeling these floodways. Third, the former ordinance site and underground bunkers are located in this area. These areas would need to be abandoned and demolished for construction. A final consideration is the location of the "El Horno Grande", "Radar", and "Ordnance" archaeological sites along the east side of the airport. Similar to the "In Between" archaeological site in Alternative A, additional study of these areas is required before construction can begin.

In considering these development constraints, three terminal sites have been considered. Shown in orange is Alternative B1 which locates the terminal outside the ASR critical area near the 12L threshold. An advantage of this site is that terminal development is located outside the ASR site. Among the disadvantages are the location of the Powerline Floodway and proposed floodway which would have to be bridged to provide roadway access and perhaps auto parking areas. Furthermore, additional property purchases to the north may be required to provide for ultimate facility development. Finally, this site is located at the Runway 12L threshold. Typically, a terminal area is best placed near midfield to minimize aircraft taxi times.

Alternative B2 (shown in yellow) locates terminal development at approximately the midpoint of Runway 12L-30R. To provide for development within this area, the ASR may have to be relocated which will require coordination with the FAA. A potential ASR site is available along the northeast boundary of the airport, south of the Powerline Floodway and west of Ellsworth Road. The proposed floodway may impact access to this area.

Alternative B3 (shown in blue) locates the terminal site outside the ASR critical area in the storage bunker and former ordinance area. Development within this area will require the demolition of these areas. This site has the advantage of being located outside the ASR critical area and near the midpoint of Runway 12L-30R.

All primary utility lines are available along Ellsworth road. Roadway access for Alternatives B and C is assumed from Ellsworth road with an ultimate direct connection to the planned San Tan Freeway. Prior to any terminal development east of Runway 12L-30R, a parallel taxiway must be constructed. A parallel taxiway extending along the existing length of Runway 12L-30R (9,300 feet) is estimated to cost approximately $6.4 million.

AIR CARGO ALTERNATIVES

Presently, there is no single building or facility dedicated solely to air cargo on the airport. Facility needs are being met in various locations on the airport. Air cargo is presently transferred directly from aircraft to vehicles on the apron. Hazardous cargo is handled on a taxiway east of Runway 12L-30R. While this may serve the present type of on-demand cargo service, regularly scheduled cargo service will require dedicated facilities.

Two likely air cargo scenarios for Williams Gateway Airport were examined in the forecast chapter. First, is a specialty cargo scenario which involves non-scheduled charter-type activities of air cargo companies and freight forwarders. This typically involves the use of a wide variety of narrow body (Boeing 727) and wide-body transport aircraft (Boeing 767), possibly even Boeing 747 aircraft. The existing apron areas are not capable of accommodating Boeing 747 aircraft due to wingspan and weight bearing capacities. A second scenario involves the development of a regional distribution station. This is characterized by the use of narrow-body transport aircraft and can include feeder type (Cessna Caravan) aircraft. More frequent delivery vehicle trips are typically involved with the regional distribution scenario.

In developing air cargo alternatives for the airport, a 23,000 square-yard apron (exclusive of taxilanes) and two 25,000-foot cargo buildings have been considered to meet long term demand (as identified in the Facility Requirements analysis). An area for ground equipment storage and movement is included in the design of each apron area. Additionally, the design of the cargo buildings and access provides for large semi-trailer access and employee and customer automobile parking areas adjacent to each cargo building.

Exhibit 4F depicts three air cargo development sites. Alternative A locates air cargo development south of the airport traffic control tower. Alternatives B and C locate air cargo development east of Runway 12L-30R at the 30R and 12L ends, respectively. While not specifically required for air cargo operations, an allowance has been provided in Alternatives B and C for the development of a parallel taxiway east of Runway 12L-30R.

Among the advantages of Alternative A is the location of this site along existing taxiways and the planned Velocity Way. A disadvantage is that direct access to an arterial roadway is not available as in Alternatives B and C where direct access is available to Ellsworth Road. Alternative B is located near the "Will E. Coyote" and "Ordnance" archaeological sites. Alternative C is located near the "El Horno Grande" and "Radar" archeological sites. A longer access roadway is needed to implement Alternative C. Air cargo facilities can be located at a runway end, in contrast to passenger terminal sites, since air cargo typically involves less frequent aircraft arrivals and departures.

98MP03-4F-10/29/98

ALTERNATIVE A

CARGO SORT BUILDINGS (25,000 s.f. each)

EQUIPMENT STORAGE

TRUCK COURT & AUTO PARKING

VELOCITY WAY

ALTERNATIVE B

CARGO SORT BUILDINGS (25,000 s.f. each)

EQUIPMENT STORAGE

TRUCK COURT & AUTO PARKING

AIRPORT PROPERTY LINE

EUDSWORTH ROAD

ALTERNATIVE C

AIRPORT PROPERTY LINE

POWERLINE FLOODWAY

PROPOSED FLOODWAY

CARGO SORT BUILDINGS (25,000 s.f. each)

EQUIPMENT STORAGE

TRUCK COURT & AUTO PARKING

1,500'

ASR CRITICAL AREA

EUDSWORTH ROAD

NORTH

0 800 1600

SCALE IN FEET

DATE OF PHOTO: JUNE, 1998

WILLIAMS GATEWAY AIRPORT

Exhibit 4F

AIR CARGO ALTERNATIVES

GENERAL AVIATION ALTERNATIVES

Considerations relative to potential general aviation alternatives include:

- **Aircraft storage hangars.** The facility needs evaluation projected the need for as many as 95 T-hangar (or T-shade) storage positions through the planning period. Presently, no T-hangars or T-shade hangars are available at the airport. Additionally, the Facility Requirements analysis indicated a need for approximately 235,400 square feet of conventional (clear-span) hangar space. This includes areas for commercial businesses providing general aviation maintenance and repair activities and larger private aircraft storage hangars typically used for corporate aircraft.

- **Terminal Facilities.** The facility needs evaluation indicated that a 6,600 square-foot terminal building might be needed by the end of the planning period to provide space for arriving and departing passengers, concessions, a pilot's lounge, etc. Presently, there is not a dedicated general aviation terminal building at the airport. Building 19 provides a pilot's lounge and waiting areas for arriving and departing passengers. Building 19 is ideally located along the middle apron (which serves transient aircraft) to serve as the public general aviation terminal. The WGAA has considered utilizing Building 15 as a general aviation terminal building once a permanent terminal site is constructed and Building 15 is no longer needed for commercial passenger service. General aviation terminal space is typically provided adjacent to large commercial conventional hangars and can serve in the same manner as a dedicated terminal building.

Consistent with previous planning, the north apron has been reserved for general aviation development. Shown in yellow and gray on both alternatives is the existing parcel layout presently used by the WGAA for the lease of land in the north apron area. As shown on both exhibits, a number of the lease parcels fronting the north apron have been leased or have existing facilities located on the parcel. For example, Hangar 46 (a designated historic structure) is located on parcel 24 while parcels 21, 22, 23 and one-half of parcel 20 have been leased.

Exhibit 4G depicts two T-Hangar (T-shade hangar) development alternatives for the north apron.

Alternative A locates T-hangar development north of the apron along all or part of parcels 4, 5, 7, 8, 9, and 10. Auto parking is located adjacent to the hangars for aircraft owner and visitor parking. With a slight modification of remaining parcels, parcels 11, 13, 14, and 16 would be available for corporate hangar development while portions or parcels 4, 5, 6 and 12 would be available for commercial/industrial

development. Parcels 17, 18, and one-half of parcel 20 would be available for commercial general aviation development (aircraft maintenance and repair activities).

Alternative B (currently under consideration by the WGAA) depicts T-hangar development along the existing apron frontage in parcels 17, 18, and one-half of parcel 20. The existing parcel layout remains unchanged with parcels 3, 7, 8, 9, 10, 11, 13, and 14 available for corporate hangar development.

Alternative A provides the advantage of reserving apron frontage for commercial general aviation development. However, no infrastructure is in place for T-hangar development as shown. The WGAA intends to develop T-hangars in 1999. While Alternative B does not specifically provide for commercial general aviation development along the north apron, commercial general aviation development parcels with apron frontage could be developed along the middle apron. Alternative B provides for more individual/corporate hangar development. A growing trend is for the development of individual/corporate hangars as these provide greater flexibility for aircraft owners than T-hangars which have limited space for related storage needs and more than one aircraft.

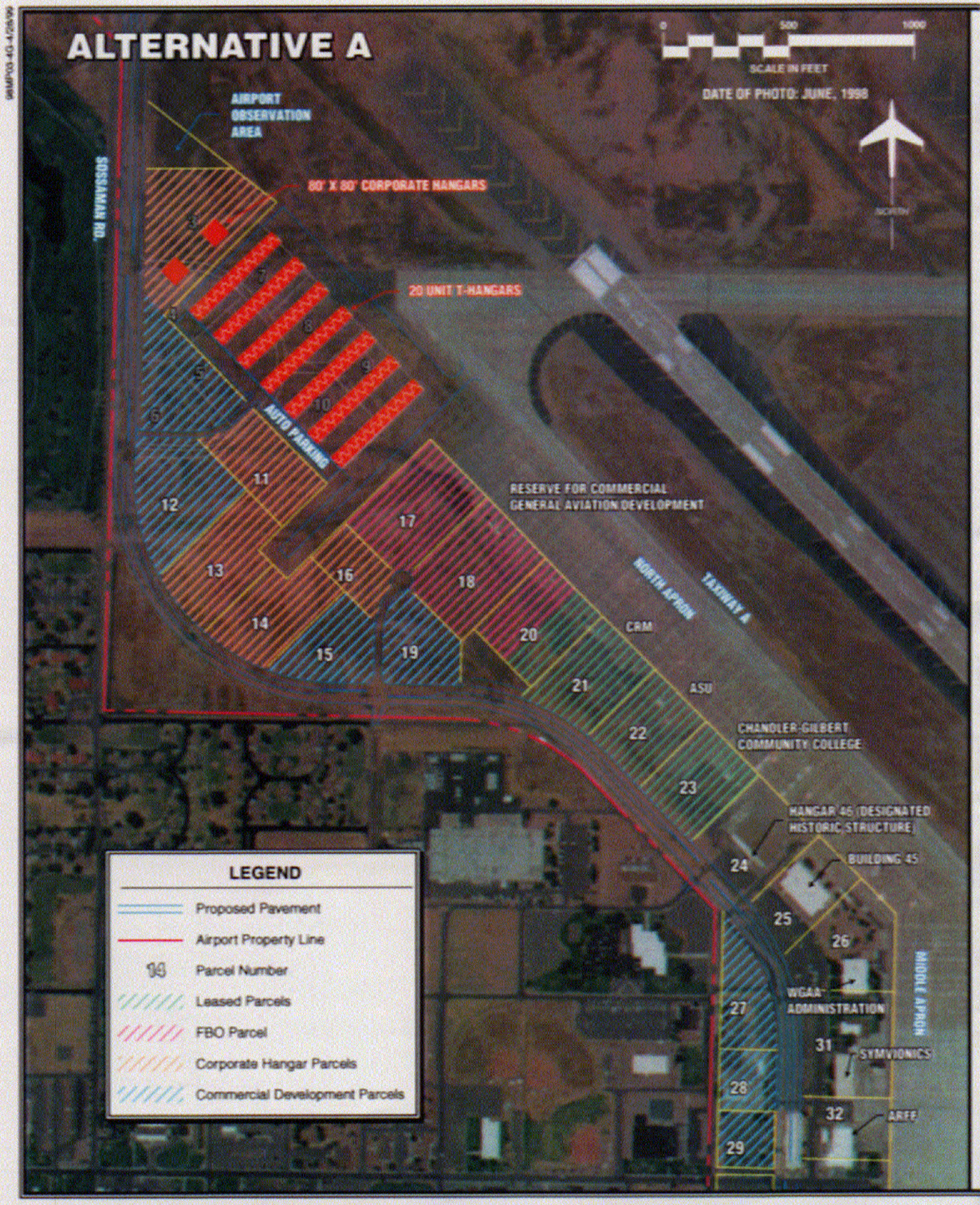
Alternative B incorporates an area for the development of an aircraft wash rack adjacent to a row of T-hangars. A similar arrangement is possible with the T-hangar layout under Alternative A. The facility requirements analysis suggested that consideration be given to providing a covered aircraft owner maintenance facility to provide an area for aircraft owners to complete minor aircraft maintenance and dispose of hazardous materials such as used aircraft oil. In either alternative, the wash rack could be covered to provide for a covered maintenance facility as well. A similar facility is in operation at Glendale Municipal Airport.

SUPPORT FACILITY CONSIDERATIONS

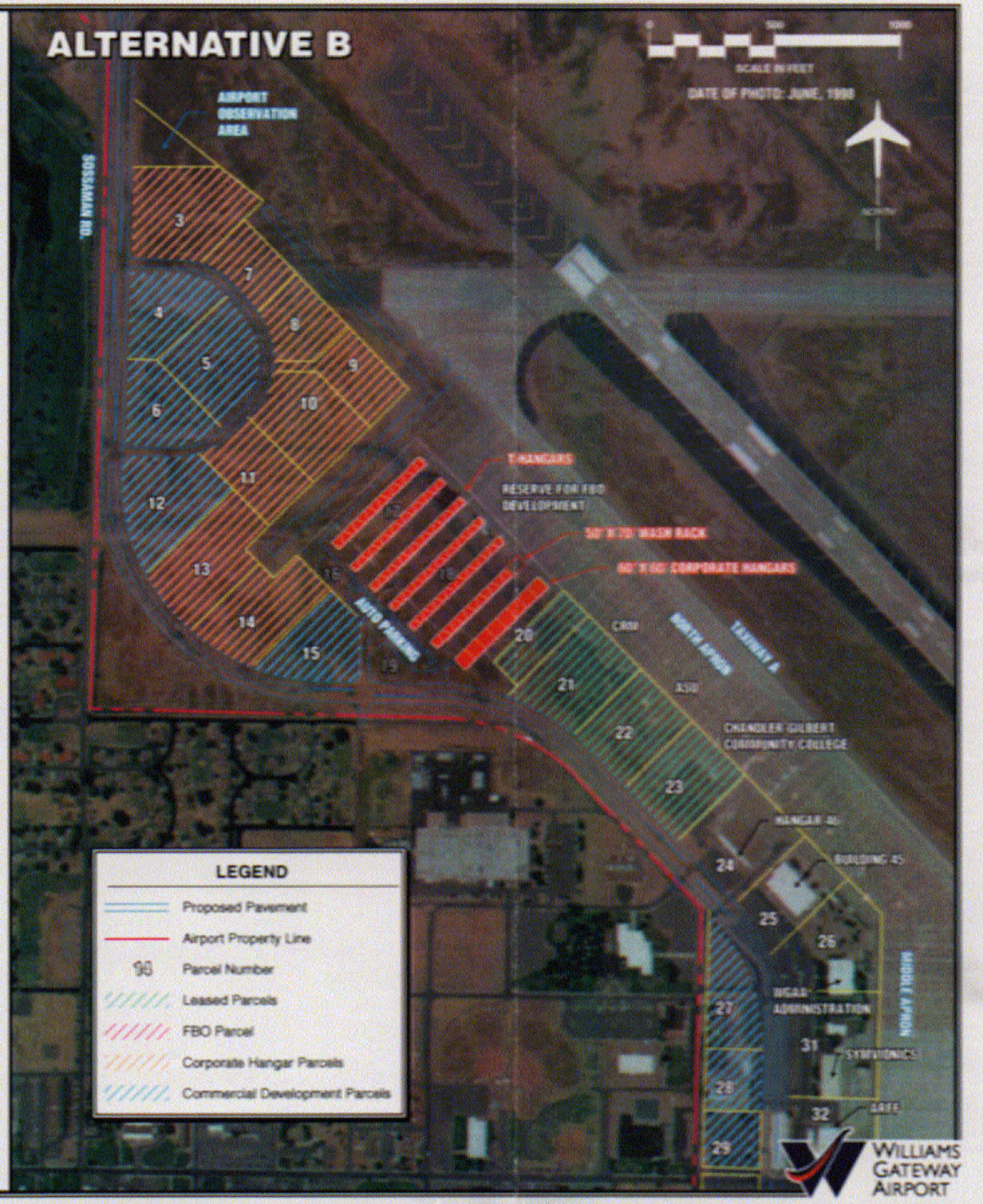
WGAA airfield, vehicle, and building maintenance operate from Building 1080 located south of the ATCT. A site plan was recently completed to identify the long term use and configuration of the maintenance building and maintenance yard. The WGAA does not anticipate building an additional maintenance facility as the existing facility is expected to serve airport maintenance needs through the planning period.

The airport rescue and firefighting (ARFF) building is located along the middle apron north of Building 19. The location of the ARFF building is driven by minimum response times to the midpoint of the farthest air carrier runway from the ARFF station as required by Federal Aviation Regulations (F.A.R.) Part 139 for airport certification. Runway 12L-30R is the farthest designated air carrier runway from the existing ARFF station. The WGAA has indicated that airport ARFF vehicles can reach this runway in the minimum response times as specified in FAR Part 139. Therefore,

ALTERNATIVE A



ALTERNATIVE B



WILLIAMS GATEWAY AIRPORT

Exhibit 4G

GENERAL AVIATION ALTERNATIVES

there is not a need for a new or additional ARFF station. A new ARFF building will be a factor of the existing building's age and size and development needs along the middle apron.

The WGAA is presently completing plans for the development of a fuel farm at the south end of the south apron along Sossaman Road. The site is expected to serve long term fuel storage needs for the west side of the airport.

LAND ACQUISITION CONSIDERATIONS

As part of the alternatives analysis, consideration was given to ultimate property acquisition needs for the airport while considering "natural" boundaries (such as existing roadways). In analyzing future development needs, development east of Runway 12L-30R would be facilitated with the relocation of the ASR site. As mentioned previously, the ASR could be relocated to a 96-acre site east of Ellsworth Road and south of the Powerline Floodway.

As shown on previous exhibits, the planned alignment for Pecos Road would leave approximately 220 acres of land between the airport and Pecos Road as privately-owned. This property can provide additional area for airport development and ensure compatible land use development next to the airport.

The runway extension alternatives detailed runway protection zone (RPZ) acquisition requirements. RPZ acquisition needs will be dependent upon the selected runway extension alternative.

Property acquisition to the north of the airport has limited value due to the location of the Powerline Floodway which would lie between existing airport property and future parcels of land. This would limit development potential between the existing airport property and future parcels of land.

SUMMARY

A master plan concept will be developed after the alternatives are reviewed by the Planning Advisory Committee and WGAA staff. Once the master plan concept has been identified, a development schedule will be prepared, and potential funding sources for recommended projects will be identified (including those projects that are eligible for federal or state funding assistance). The remaining chapters of the master plan will be used to refine a final concept through the development of detailed layouts and a phased construction program.